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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/748,965	12/27/2000	Marc W. Cantell	BU-99-022B	7066

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EXAMINER

MOORE, KARLA A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/17/2002

4

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-4

Office Action Summary

Application No.

09/748,965

Applicant(s)

CANTELL ET AL.

Examiner

Karla Moore

Art Unit

1763

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 10-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Art Unit: 1763

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,478,780 to Koerner et al. in view of U.S. Patent No. 5,043,299 to Chang et al.

3. Koerner et al. disclose an apparatus for forming a silicide on a surface of a silicon (column 4, row 59) semiconductor substrate, comprising: a plurality of interior chambers (Figure 1, 1-6; abstract) in which multiple method stages (including removing an oxide using a cleaning agent, depositing a metal layer and heating) can be carried out at high vacuum without interruption.

4. With respect to claim 11, the apparatus is adapted to heat a substrate to form a silicide on a surface of the substrate (column 3, rows 35-39).

5. With respect to claim 12, at least one interior chamber is adapted to remove said oxide from said surface of the substrate while under continuous vacuum (column 3, rows 6-7) and at least one interior chamber adapted to deposit a metal on said surface of the substrate while under a continuous vacuum (column 3, rows 35-36).

6. With respect to claim 13, at least one interior chamber is adapted to heat said substrate (column 5, rows 9-10).

7. With respect to claim 14, the apparatus is adapted to transfer said substrate between chambers without breaking vacuum conditions (column 5, rows 27-30).

8. With respect to claim 17, the deposition metal may be cobalt (column 3, rows 35-36).

9. With respect to claim 18, the interior chamber adapted to deposit said metal on said surface of said substrate is a vapor-sputtering device (column 3, rows 35-36).

Art Unit: 1763

10. With respect to claim 19, the apparatus is further adapted to transfer said substrate to said heating chamber from said metal deposition chamber (column 5, rows 27-30).
11. With respect to claim 20, the deposited silicide is cobalt silicide (column 3, rows 35-40).
12. However, while Koerner et al. do disclose that the interior chambers are equipped with the apparatus known to be needed for the respective processes (column 5, rows 11-15) they fail to disclose the specific structural details. Koerner et al. further fail to disclose the use of nitrogen trifluoride as a cleaning gas to remove silicon oxides.
13. Chang et al. disclose an apparatus for forming a film on a semiconductor substrate comprising: at least one workpiece holder (Figure 1, 16); at least one pump (90); at least one line operatively connected between said at least one pump and said chamber for evacuating said chamber (26,56); a least one input line adapted to provide a chemical agent into said chamber (22); at least one output line adapted to remove said cleaning agent (26); a heating element (15,45) in said chamber adapted to heat said substrate to an elevated temperature; and a reactor adapted to deposit a metal (50). The apparatus and process of Chang et al. are provided for the purpose of processing a wafer without exposing the cleaned wafer to conditions that would re-contaminate the cleaned wafer prior to deposition.
14. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have equipped the chambers with the apparatus known to be needed for the respective processes in Koerner et al. in order process a wafer without exposing a cleaned wafer to contamination prior to deposition.
15. Chang et al. further teach the use of nitrogen fluoride to as a cleaning gas for the purpose of removing silicon oxides from silicon surfaces (column 3, rows 16-20).
16. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided nitrogen trifluoride as a cleaning gas in Koerner et al. in order to clean silicon surfaces as taught by Chang et al.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 1763

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
July 14, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700